

Claims:

1. A composition for the co-delivery to a cell of a nucleic acid and an assistor protein comprising vesicles formed of amphiphilic components, wherein the nucleic acid operatively encodes an antigenic protein or portion thereof which shares at least one epitope with the assistor protein, the composition comprising said nucleic acid and said assistor protein associated with the same vesicles as one another.

2. A composition according to any preceding claim wherein the vesicles are liposomes formed from liposome forming materials and said nucleic acid and said assistor protein are associated with the liposomes.

3. A composition according to claim 2 in which the nucleic acid is entrapped in the intravesicular space of the liposome.

4. A composition according to claim 2 or 3 in which the assistor protein is accessible at the outer surface of the liposomes.

5. A composition according to any preceding claim in which the amphiphilic components include at least one cationically charged component in an amount such that the vesicles have an overall positive charge.

6. A composition according to claim 5 in which the cationic component is selected from 1,2-bis(oleoyloxy)-3-(trimethylammonio)propane (DOTAP), 1,2-bis(hexadecyloxy)-3-trimethylaminopropane (BisHOP), β [1-(2,3-dioleyloxy)propyl]-N,N,N-triethylammoniumchloride (DOTMA) and 3β -(N,N-dimethylaminoethane)carbamylolesterol (DC-CHOL).

7. A composition according to any preceding claim, in which the nucleic acid comprises more than one molecule each of which encodes a different antigenic protein, and in which the assistor protein includes
5 corresponding proteins sharing epitopes with each such antigenic protein.

8. A composition according to claim 7, in which
10 the nucleic acid molecules are associated with the same vesicle.

9. A composition according to any preceding claim, in which the antigenic protein and the assistor protein
15 are derived from a virus, preferably influenza.

10. A composition according to any preceding claim in which the nucleic acid is DNA, preferably plasmid DNA.

20 11. A composition according to any preceding claim which is a vaccine.

12. A composition according to claim 11 adapted for subcutaneous, intramuscular, intravenous, intradermal,
25 nasal, oral, mucosal or pulmonary administration.

13. A method of generating an immune response in an animal by administering to the animal a composition according to any of claims 1 to 12.

30 14. A method according to claim 13 in which the immune response comprises an antibody response specific to the antigenic protein and/or assistor protein.

35 15. A method according to claim 13 or 14 in which the immune response involves stimulation of cytotoxic T-

lymphocytes.

16. A method according to any of claims 13 to 15 which confers immunity against infection by an infectious agent, preferably a virus.

17. A process for forming a liposomal composition comprising the steps

(a) providing an aqueous suspension of small unilamellar (SUVs) formed of liposome forming materials;

(b) contacting the aqueous suspension of SUVs with nucleic acid which operatively encodes an antigenic protein to form an SUV-nucleic acid suspension;

(c) dehydrating the SUV-nucleic acid suspension to provide a dehydrated mixture; and

(d) rehydrating the dehydrated mixture in an aqueous resuspending medium to form a suspension of nucleic acid containing liposomes,

including the step of introducing an assistor protein whereby the nucleic acid containing liposomes are associated with said assistor protein.

18. A process according to claim 17, in which the assistor protein is contacted with the aqueous suspension of SUV's before, during or after step b and before step c.

19. A process according to claim 17 in which the assistor protein is present in the resuspending medium.

20. A process according to any of claims 17 to 19 in which the liposome forming materials comprise at least one phospholipid and at least one sterol.

21. A process according to claim 20 in which the materials comprise at least one cationic compound and the

liposomes have an overall cationic charge.

22. A process according to any of claims 17 to 21
wherein the weight ratio of nucleic acid to liposome
5 forming materials is in the range 1:100 to 1:1000,
preferably 1:100 to 1:300.

23. A process according to any of claims 17 to 22
wherein the weight ratio of nucleic acid to assistor
10 protein is in the range 1000:1 to 1:1, preferably 30:1 to
5:1.

24. A process according to any of claims 17 to 23
wherein the dehydration is by freeze-drying.